

## Attachment B

### NRC STAFF FEEDBACK ON NUSCALE'S RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 9182

#### **Design Certification Application, Final Safety Analysis Report Tier 2, Section 2.3.5, "Long-Term Atmospheric Dispersion Estimates for Routine Releases"**

#### Request for Additional Information (RAI) 9182, Information Request 1: Atmospheric dispersion factors (X/Q values) and deposition factors (D/Q values)

- a) - The applicant's response states: "The lower limit of the standard output range of the XOQDOQ code is 0.25 miles. XOQDOQ is outside of its standard output range at the 400 and 420 foot distances to the site boundary mentioned above and therefore NARCON was used to calculate the routine release X/Q value(s) presented in FSAR Table 2.0-1." However, while the program's default settings computes concentrations at distances between 0.4 – 80.5 kilometers (km) (0.25 and 50 miles (mi)), the user can specify receptor distances for the program to calculate concentrations. The XOQDOQ code is used to implement the guidance in RG 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," and Figures 1-10 in RG 1.111 provide plume standard deviation, plume depletion, and relative deposition as a function of plume travel distance with a lower limit of 0.1 km (328 feet (ft)). Therefore the staff finds that XOQDOQ can be used to calculate the routine release X/Q site parameter values presented in the Final Safety Analysis Report (FSAR).

#### NuScale Response:

NuScale will take this feedback under advisement.

- The applicant's response states: "NARCON was used to calculate the routine release X/Q value presented in FSAR Table 2.0-1." The NARCON model calculates X/Q values in hourly intervals whereas the routine release X/Q values generally represent annual averages. The staff is unaware how NARCON can be used to calculate annual average X/Q values.

#### NuScale Response:

NuScale provided an explanation on how NARCON was used to produce essentially an equivalent annual average. The NRC staff understood NuScale's approach but expressed concerns regarding its appropriateness.

- The applicant's response states: "Normal radioactive effluent discharges from the plant exhaust stack are modeled as an elevated release (37.0 meters) [or 121 feet above ground level]." FSAR Tier 2, Chapter 9, "Auxiliary Systems," Section 9.4.2.2.1 states the minimum stack height is set in accordance with criteria in RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," Section 3.2.2 which states the elevated (stack) release mode is appropriate for releases from a freestanding, vertical, uncapped stack that is outside the directionally dependent zone of influence of adjacent structures. Such a stack should be more than 2-1/2 times the height of the adjacent structures or be located more than 5L downwind of the

trailing edge of upwind buildings, and more than 2L upwind of the leading edge of downwind buildings, where L is the lesser of the height or width of the building creating the downwind or upwind wake. The plant exhaust stack is within a distance of 2L of the reactor building (which has a height of 81 ft above plant grade) and is less than 2 times the height of the reactor building. Considering that the stack height is less than 2 times the height of the adjacent solid structures, the staff finds the stack discharges do not meet the criterion to be modeled as an elevated release.

NuScale Response:

NuScale provided an explanation for the reference point for the 37 meter release height. It was an assumed stack release height which took under consideration encountering elevated terrain as the plume moves downwind.

- The applicant's response states: "The D/Q value is assumed to be a factor of 1.0E-02 times that of the X/Q value calculated by NARCON," and "The factor of 1.0E-02 is reasonable because the ratio of D/Q to X/Q reported by some other applicants is 1.0E-02." The staff would like references for the 1.0E-02 value.

NuScale Response:

NuScale discussed other applicants (e.g., AP1400, US-APWR) that have used this ratio in defining their D/Q site parameter values.

- FSAR Tier 2, Table 11.3-12, "Assumptions for Routine Airborne Effluent Release Point Characteristics for Offsite Receptors," presented in the response to RAI 9185 states the assumptions for routine effluent release point characteristics for offsite receptors include vent/stack exhaust orientation and restrictions to exhaust air flow which are listed as "not applicable." This conflicts with RG 1.194, Section 3.2.2 guidance which states elevated (stack) releases should be vertical and uncapped.

NuScale Response:

NuScale will take this feedback under advisement.

RAI 9182. Information Request 3: Release Point Characteristics

b) The applicant's response states: "The plant exhaust stack is not a part of the NuScale Standard Design. The plant exhaust stack has several design commitments that it must be built to per FSAR Section 9.4.2.2, however there is a range of plant exhaust stack designs that could be implemented by the combined operating license applicant within those design commitments." Consequently, the staff believes the design of the plant exhaust stack should be added to the "System, Structure, or Component" column in Table 1.8-1, "Summary of NuScale Certified Design Interfaces with Remainder of Plant."

NuScale Response:

NuScale will make this suggested change in the FSAR and submit to the NRC via a self-initiated letter (as opposed to an RAI response letter).